

ABSTRACT OF THE DISCLOSURE

5 A laser resonator for generating a laser beam having beam quality along two transverse axes that is determined primarily by the mode discrimination characteristics of one axis. The apparatus including a means for providing a collimated beam of electromagnetic energy with a predetermined orientation with respect to a line of sight thereof, and, a means for rotating the beam such that a transverse mode selection therefor
10 is the same for two orthogonal directions thereof. The first means includes a slab laser having principal axes, and the second means includes a porro prism or a Benson prism. The prism is rotated 45 degrees about the line of sight with respect to the slab axes. The beam is rotated through successive round trip passes through the slab. A telescope, or an anamorphic telescope may be disposed between the slab and the prism. The resonator has
15 a high aspect ratio slab lasing medium with a first and a second end that emit a laser beam. An aperture stop with a narrow transverse dimension and an orthogonal wide transverse dimension defines the laser beam profile. The slab itself may define the aperture stop. A first reflector is aligned to reflect the laser beam emitted from one end of the slab back into the slab, and thereby define a first end of a resonant cavity. An anamorphic telescope is aligned to receive and reshape the laser beam profile to be substantially symmetrical about its transverse axes. The beam profile of the reshaped
20 laser beam is rotated 90° and reflected, by a second reflector, back into the telescope, defining the second end of the resonator. The reflectors may be porro prisms, mirrors, or Benson prisms. Polarization out-couplers are used in conjunction with electro-optic Q-
25 switches to out-couple laser energy. The slab may be solid state Yb:YAG.